ViaLite
Alarm Concentrator

User Manual

LAC-HB-5

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Instrument Care and Safety Information

*Please read the whole of this section before using your **ViaLite** product. It contains important safety information and will enable you to get the most out of your link.*

Electrical Safety

The ***ViaLite*** 19" Rack Case power supply units are Safety Class 1 products (having a metal case that is directly connected to earth via the power supply cable).

When operating the equipment note the following:

- Hazardous voltages exist within the equipment. There are no user serviceable parts inside, and the covers should only be removed by suitably qualified personnel.
- The equipment does not have an isolating switch on the mains inlets. Equipment must be installed within easy reach of a clearly labelled dual pole mains isolation switch.
- Make sure that only fuses of the required rated current, and of the specified type (anti-surge, quick blow, etc.) are used for replacement.

Optical Safety

The ***ViaLite*** RF Alarm Concentrator modules contain optical sources operating at 1300nm nominal. These devices are rated at under IEC825-1 "Safety of Laser Products", Part 1, First Edition, 1993 as CLASS 1 radiation emitting devices.

When operating the equipment note the following:

- Never look into the end of an optical fibre directly or by reflection either with the naked eye or through an optical instrument.
- Never leave equipment with radiating bare fibres accessible – always cap the connectors.
- Do not remove equipment covers when operating.
- Details of optical connections to the units, compatible fibre types and care instructions can be found in the ***ViaLite*** system handbook. Please read this section before using the link.

Adjustment, maintenance and repair of the equipment should only be carried out by suitably qualified personnel.

For more information on the *ViaLite* range of products, please refer to the *ViaLite* system handbook Lxx-HB.

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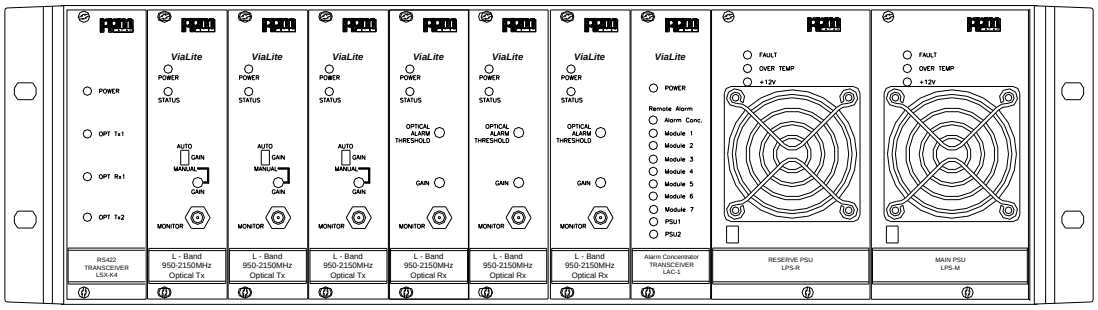
1 Introduction

1.1 ViaLite Alarm Concentrator

PPM's ***ViaLite*** Alarm Concentrator provides a high reliability, transparent cross-site connection for the transport of system alarm information for ***ViaLite*** communications equipment.

Using optical fibre, information about alarm status from a remote location up to 20km away can be relayed to the local module, whilst overcoming problems due to path loss and electro-magnetic interference etc.

This enables PPM ***ViaLite*** equipment to be fully integrated into an Operations, Maintenance and Control environment or a redundantly switched network.



PPM's ***ViaLite*** Alarm Concentrator offers the following key advantages:

- Visual indication of remote module status e.g. laser fail, low optical carrier etc.
- Parallel output of remote module status, for integration into redundantly switched network
- Serial output of local and remote module status for interface to PC etc. via RS232
- Operation from 0m to >20km

Complementary PPM ***ViaLite*** Products

- RF Signal modules for RF GPS, L Band, 70/140MHz, Broadband 2kHz-1500MHz and 10MHz-3GHz etc.
- 19" Rack Case
- Redundancy Switch Module for fully automated 1:1 redundant operation.
- Dual redundant power supplies for maximum availability

1.2 Part Numbers

This handbook covers the following modules:

Part Number	Transceiver	FC/APC	Plug-In	Shielded Module
LAC-1	•	•	•	

Refer to the ***ViaLite*** System Handbook for further details on the following ***ViaLite*** items:

Part Number	Description
LRK1S	Chassis for desktop or 19" rack installation. Accommodates up to 8 plug-in modules and 2 mains power supplies.
LRK2S	Chassis for 19" rack installation. Accommodates up to 8 plug-in modules and 2 mains power supplies.
LPS-M	Main Power Supply plug-in for LRK1S or LRK2S.
LPS-R	Reserve Power Supply plug-in for LRK1S or LRK2S.
LRS-10/30/40	Redundancy Switch Module
F6R1/x	FC/APC Patchlead, 2.8mm jacket. Length defined in metres by "x" (1m, 2m, 5m, 10m)

1.3 Care of fibre optic connectors

Fibre optic connectors are more sensitive to damage and contamination than electrical connectors. In order to maintain full performance from your fibre optic link system, it is necessary to take care to protect the connectors from damage and to keep them clean.

The cable connectors should always be cleaned before they are used, even if they have been protected by dust caps.

When the fibre optic cables are not connected, it is essential that the cable and module connectors are protected by the dust caps provided with the system. Failure to do so may result in damage to the fibre ends, which are critical to the system performance.

Please refer to section 2.2 for fibre optic cable handling and cleaning instructions.

2 Setting up and Understanding the Product

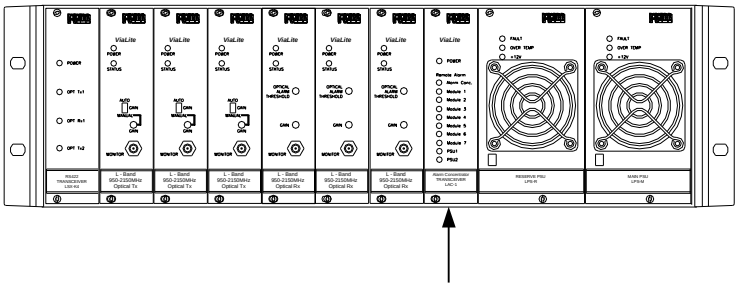
Please read fully document Lxx-HB for information on installing your ***ViaLite*** equipment before commissioning your RF link system.

PPM's ***ViaLite*** Alarm Concentrator Transceiver module allows users to monitor the status of remotely located fibre optic link modules.

The status may be monitored

- visually via front panel LEDs,
- over a serial data output, and
- over a parallel data output.

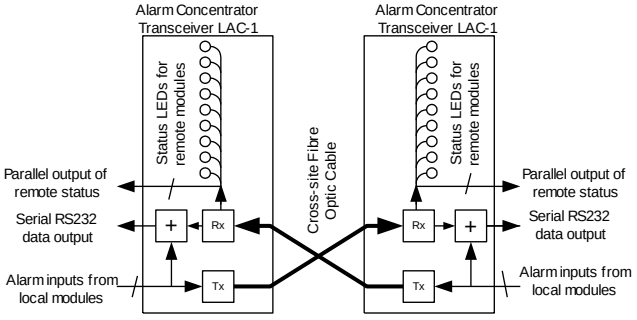
The Alarm Concentrator Transceiver module occupies position 8 in the ***ViaLite*** 19" rack shelf. It concentrates all alarms from neighbouring modules within the same rack, and converts them into a serial data stream for transmission over optical fibre to an identical Alarm Concentrator Transceiver module at the remote location. Here, the data stream is de-multiplexed to provide a visual indication of the status of remote modules via front panel LEDs.



Position 8

The remote data stream is forwarded, together with local alarm information, in an RS232 electrical format to external equipment e.g. a PC or other system controller, in response to a poll command on the serial data input via the D-Sub connector at the rear of the 19" rack shelf. The remote module status is also made available in parallel form via the D-Sub connector. This allows the system to be integrated into a redundantly switched network.

The Alarm Concentrator modules are bi-directional, so that the status of remote modules can be determined at either end of a cross-site connection. This greatly aids the commissioning and fault location during installation.



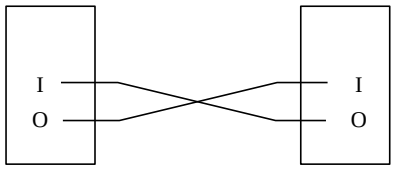
2.1 Module Operation

2.1.1 Installation

The Alarm Concentrator module is available in plug in module form for use in PPM's ***ViaLite*** 19" Rack Case or in standalone configuration with a Converter Sleeve.

If the module is being used in conjunction with the 19" Rack Case, the Alarm Concentrator must be inserted into position 8 (immediately to the left of the power supplies). This as shown in silkscreen on the backplane and engraved onto the rear panel. The module is "hot pluggable" so can be inserted with power supplied to the rack case without affecting signal modules already installed.

Optical connections between local and remote modules are made at the rear of the module. Using two clean FC/APC cross site cables, link the input ports "I" of each module to the output ports "O" of the mating module.



2.2 Fibre Optic Cable & Connectors

2.2.1 Care of fibre optic connectors

Modern optical connectors offer very high levels of performance, reliability and repeatability. However, they are more sensitive to damage and contamination than electrical connectors. In order to maintain full performance from your fibre optic link system, it is necessary to take care to protect the connectors from damage and to keep them clean.

The light carrying core of a singlemode optical fibre is 8µm in diameter, and in a mating connector pair, the two cores must be aligned to better than 1µm in order to minimise insertion loss. The optical connectors used in PPM's systems maintain their performance even after hundreds of matings, as long as they are kept clean. Dirt or contamination may result in the core being obscured or misaligned, and this in turn results in high insertion loss and poor link performance.

The following precautions should be taken to maintain the performance of your link.

- The cable connectors should always be cleaned before they are used, even if they have been protected by dust caps.

- When the fibre optic cables are not connected, it is essential that the cable and module connectors are protected by the dust caps provided with the system.

2.2.2 Connector and Cable Types

All ***ViaLite*** modules use singlemode (8µm/125µm) fibre terminated with FC/APC optical connectors. Cross-site cables are available in standard (3mm diameter) and heavy-duty (8mm diameter) variants.

FC/APC is an industry standard for angle-polished optical connectors and must not be confused with standard FC/PC connectors. The two connector types are not interchangeable and mating one with the other will damage both the cross-site interconnect and the module.

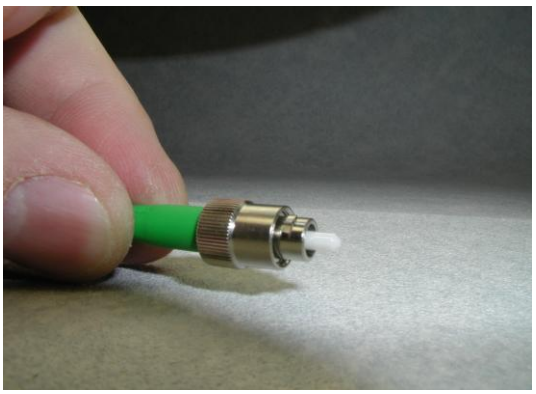
2.2.3 Connecting and Disconnecting

The cable connectors should be cleaned before each and every connection (see 2.2.4).

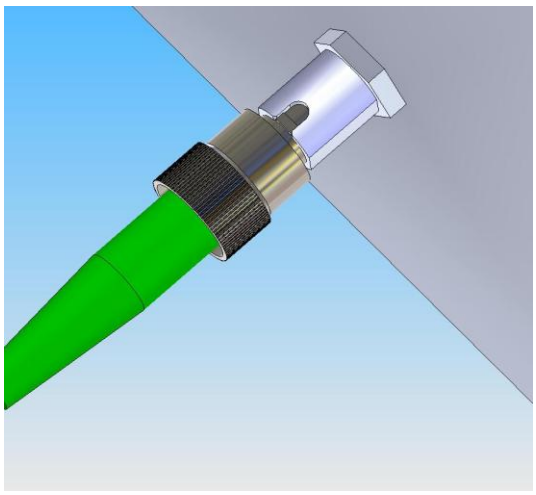
To connect FC/APC optical connectors, align the centre ferrule on the cable connector with the female receptacle in the module. There is a lug on the side of the ferrule, which must aligned to the gap in the receptacle. When they are in alignment, push the plug gently home and finger tighten the knurled collet onto the receptacle. See Figure 1 below.

To disconnect FC/APC connectors, unscrew the knurled collet on the plug and gently withdraw the plug. Replace the dustcaps on both the receptacle and the cable connector.

Figure 1
(a) showing FC/APC connector with dust cap removed, (b) showing alignment of the lug on the side of the ferrule, which must match the gap in the receptacle shroud before gently pushing the plug home and finger tighten the knurled collet nut onto the threaded receptacle.



(a)



(b)

2.2.4 Care and Cleaning

The cable optical connectors should be cleaned **before each and every use**, even where they have been protected with dust caps.

It should only be necessary to clean the female receptacles on the modules if problems are being experienced.

Cleaning items required

- Lint free fibre cleaning tissues (normal cosmetic tissues produce dust and are not acceptable);
- Reagent grade Iso Propyl Alcohol;
- Air duster or FILTERED compressed air line.

Cable Connector Cleaning

- Dampen a patch of cleaning tissue with IPA and clean all surfaces of the plug ferrule.
- Using a dry cleaning tissue, dry the ferrule and polish the end face.
- Using the air duster, blow away all residue from the end of the connector.

Module Female Receptacle Cleaning (only recommended if problems are being experienced)

- Twist a cleaning tissue to form a stiff probe, and moisten with IPA. Gently push the probe into the receptacle and twist around several times to dislodge any dirt.
- Repeat the above process with a dry tissue.
- Using the air duster, blow away all residue from the receptacle.

Important Notes

- IPA is flammable. Follow appropriate precautions and local guide-lines when handling and storing IPA.
- IPA can be harmful if spilt on skin. Use appropriate protection when handling.
- It should only be necessary to clean the female receptacles on the modules if problems are being experienced.
- **Never inspect an optical fibre or connector with the naked eye or an instrument unless you are convinced that there is no optical radiation being emitted by the fibre. Remove all power sources to all modules, and completely disconnect the optical fibres.**

2.2.5 Minimum Bend Radius

Because the optical fibre is made of glass, it is important not to subject it to a tight bend radius. For this reason, the fibre has a minimum bend radius (MBR) specification, beyond which the cable cannot be bent without excessive loss or damage occurring.

MBR specifications for PPM fibre are given in the ***ViaLite*** System Handbook Lxx-HB.

3 Using the Alarm Concentrator Module

3.1 Connecting the Module

Install as described in section 2.1. Immediately after power-up, the module will perform a self test during which the LEDs will illuminate in a set pattern. Assuming another Alarm Concentrator is connected via the rear panel optical connectors, the module should be operational within 5 seconds. If the "Alarm Conc." LED on the front panel is still illuminated red at this time, then there is not a valid connection between the module and another remote Alarm Concentrator module.

3.2 Front Panel Indicators

The transmitter has 11 front panel LEDs to indicate status.

	Power LED	**Alarm Conc. LED**	**Status LEDs (9)**
OFF	Unit is Off	Unit is Off	Unit is Off or No valid ACM link
GREEN	Unit is OK	ACM Link OK	Remote Module OK
RED	Internal Fault	No valid ACM link	Remote Module Fault

3.3 Parallel Alarm Outputs

With the Alarm Concentrator module fitted, all REMOTE module alarms are available on 15way D-Sub connector at module position 8 on the rear panel.

This connector can be used to take alarm information to the local units for remote end switching using the ***Vialite*** LRS-n redundancy switch. See LRS-HB for details.

The open collector alarm outputs sink current in the absence of an alarm condition. When an alarm occurs, the output goes into a high impedance state. Refer to section 4.4 for details of the alarm interface.

Backplane Alarm Concentrator Module 15way Connector (CONN8) - Pin Connections

Pin Number	**Function**	**Pin Number**	**Function**
1	Serial RS232 Data Output	9	Serial RS232 Data Input
2	Remote Module 1 Alarm	10	Remote Module 4 Alarm
3	Remote Module 2 Alarm	11	Remote Module 5 Alarm
4	Remote Module 3 Alarm	12	Remote Module 6 Alarm
5	Alarm Concentrator Alarm	13	Remote Module 7 Alarm
6	+V	14	Remote PSU Alarm*
7	Remote PSU Alarm*	15	GND
8	GND		

* There is only one alarm output for remote PSU failure. If either the Main or the Reserve remote power supply modules fail, the local Alarm Concentrator will register a PSU alarm output.

It is possible to determine which PSU has failed by observation of the status LEDs on the local Alarm Concentrator, or by polling either Alarm Concentrator module using the RS232 feature.

3.4 Serial Communication

The status of the Local and Remote modules as well as the Alarm Concentrator modules themselves can be ascertained by polling either Alarm Concentrator module in a system pair. This can be done using hyperterminal on a PC, or by using any proprietary RS232 controller.

The connection to the RS232 port is made on rear panel 15way D Sub connector CONN8 (immediately behind the Alarm Concentrator Module). Pinout details are shown in section 3.3.

The part number of the serial data lead required to interface with this port is 73635. This lead can be obtained from your local PPM representative.

3.4.1 Protocol

The protocol used for communication with the Alarm Concentrator is as follows :

Parity : **None**
Number of Stop Bits : **1**
Number of Data Bits : **8**
Data Rate : **9600 baud**

3.4.2 Command Set

The Alarm Concentrator module can be polled for information using simple ASCII characters. The table below lists valid commands.

Command	**Function**
P	Poll Status. This will return an ASCII serial data stream in the following format : LOC1 OK or FAIL LOC2 OK or FAIL LOC3 OK or FAIL LOC4 OK or FAIL LOC5 OK or FAIL LOC6 OK or FAIL LOC7 OK or FAIL LOC PSU1 OK or FAIL LOC PSU2 OK or FAIL LAC OK or FAIL REM1 OK or FAIL REM2 OK or FAIL REM3 OK or FAIL REM4 OK or FAIL REM5 OK or FAIL REM6 OK or FAIL REM7 OK or FAIL REM PSU1 OK or FAIL REM PSU2 OK or FAIL
W	Software Issue.

4 ViaLite Alarm Concentrator Technical Data

4.1 Specifications

Parameter	Value
Serial Data Input/Output	9600 Baud RS232, 8N1 via 15-way D-type Female on 19" Rack Case or Converter Sleeve
Parallel Data Input	Compatible with open-collector alarm outputs via 19" Rack Case backplane PCB from local modules
Parallel Data Status Outputs	Remote 1, Remote 2, Remote 3, Remote 4, Remote 5, Remote 6, Remote 7, Remote PSU, Alarm Concentrator
Front Panel Indicator LEDs	"Power" – Alarm Concentrator local supply voltage Remote Status LEDs: "Alarm Concentrator" – Confirms that data is being received from remote Alarm Concentrator "Module 1" – Alarm status of remote module 1 "Module 2" – Alarm status of remote module 2 "Module 3" – Alarm status of remote module 3 "Module 4" – Alarm status of remote module 4 "Module 5" – Alarm status of remote module 5 "Module 6" – Alarm status of remote module 6 "Module 7" – Alarm status of remote module 7 "PSU1" – Alarm status of remote Power Supply Module 1 "PSU2" – Alarm status of remote Power Supply Module 2
Power and Voltage Consumption	<4W at +12VDC ± 0.5VDC
Operating Conditions	
Operating Temperature	0°C to +40°C
Storage Temperature	-40°C to +70°C
Optical Characteristics	
Output Power	-20dBm nominal
Wavelength	1310+/-20nm
Fibre	Singlemode 9/125, Corning SMF28 or equivalent
Optical Connector	FC/APC Narrow key, >60dB return loss, Suhner FCPC-Z/M-A601
Optical Path Length	0m to 20km for 1300nm, single-mode fibre
Optical Power Budget	10dB (Typical fibre losses: Fibre: 0.4dB/km; Connectors: 0.5dB max.)

4.2 Optical Budget Calculations

The maximum optical loss between local and remote modules to guarantee correct operation of the Alarm Concentrator link is 8dB. The table below indicates typical losses for optical components that are CLEAN AND IN GOOD CONDITION. The total loss of all the optical components in the system should not exceed 8dB.

Optical cable	0.4dB/km
FC/APC Connectors	0.5dB per bulkhead connection

4.3 Module Dimensions

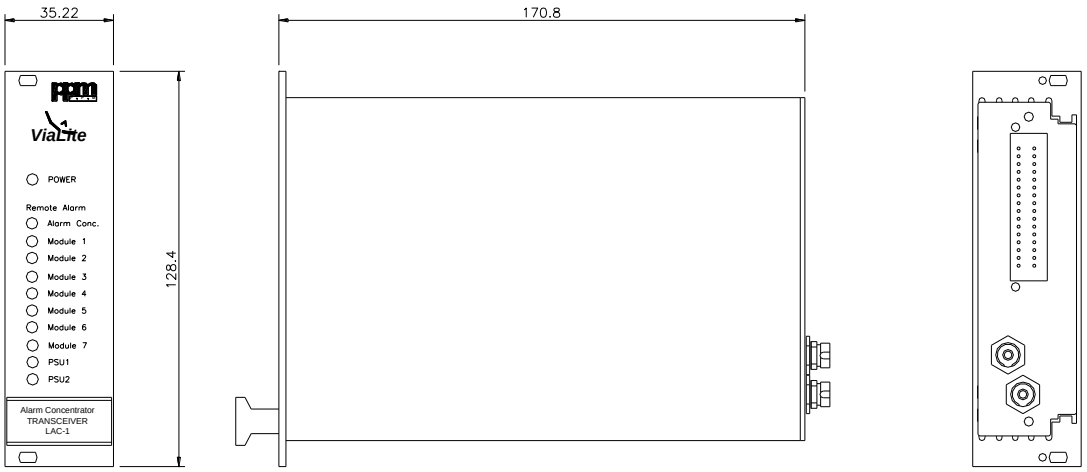
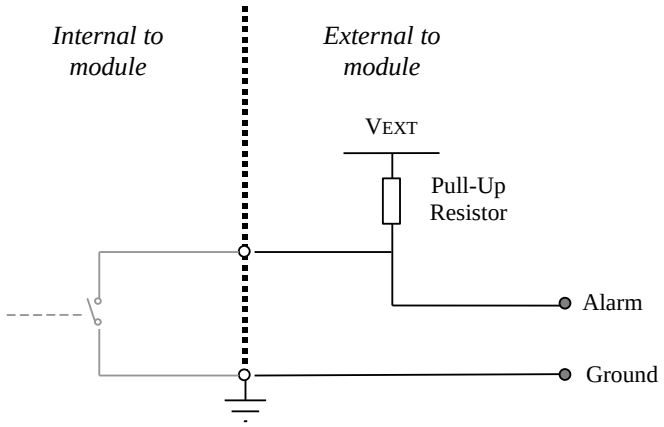


Figure 1: Plug-in Module

4.4 Alarm Connections

The circuit below shows how the alarm output should be configured for all types of ViaLite signal module. The switch (to the left of the dotted line) is internal to the module. The circuitry to the right of the dotted line is provided by the system user*.

In the presence of an alarm condition, the module will act as a high impedance node and will NOT sink current. This is a fail-safe system in that an alarm condition will be raised when a module is not present. This is an important factor when commissioning link management systems, as blank module positions will register module faults.



* This circuitry is also provided by the Redundancy Switch module and the Alarm Concentrator module. When either of these modules are used, the alarm outputs can not be considered "VOLT FREE". This is because the Redundancy Switch module and the Alarm Concentrator modules use the same module alarm outputs to detect whether a unit has failed. When these modules are used, a voltage of between 5V and 12V may be present on the 'Alarm' output line when the module is in the failed mode. When the module is working correctly, the voltage on the 'Alarm' output line will be 0V (+1.0/-0). If true "VOLT FREE" contacts are required, please consult PPM.

Maximum current = 50mA
Maximum voltage = 15V

5 Maintenance and Fault-Finding Guide

Refer to the following table that gives a list of commonly encountered problems and suggested solutions.

Fault	Possible Causes	Solution
Power LED does not light.	Power source not connected.	Connect power source.
Power LED lights up RED.	Internal fault.	Consult local PPM office.
Alarm Conc. LED stays RED.	Remote module not powered. Optical connectors absent, dirty or damaged. Optical loss between local and remote location too high.	Power up remote module. Connect two clean undamaged optical fibres between modules. Consult optical budget section in handbook.
Status LEDs lights up RED.	Remote module faulty or absent.	Remedy module fault at remote location appropriately.

The ***ViaLite*** range of equipment is precision engineered and calibrated for optimum performance and accuracy before dispatch.

However, in the event of any problems or queries arising about the equipment, please contact PPM or your local agent.

6 Product Warranty

The Company guarantees its products, and will maintain them for a period of three years from the date of shipment at no cost to the customer. Extended warranty options are available at the time of purchase.

Please note that the customer is responsible for shipping costs to return the unit to PPM.

The Company or its agents will maintain its products in full working order and make all necessary adjustments and parts replacements during the Company's normal working hours provided that the Customer will pay at the rates currently charged by the Company for any replacements made necessary by accident, misuse, neglect, wilful act or default or any cause other than normal use.

Claims must be made promptly, and during the guarantee period.

IMPORTANT: -

Please contact both your selling agent and PPM prior to returning any goods for Warranty or Non-Warranty repairs. Goods will not be accepted without a valid Goods Return Number (GRN).

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